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ABSTRACT

This study examined the extent to which situational context differentially influences components of play. Two groups of play variables were distinguished: (1) style variables, (reflecting the overall tempo and diversity of play) and viewed as relatively sensitive indicators of short term reactions of situations; and (2) structural variables, viewed as relatively sensitive indicators of more enduring aspects of cognitive development. Children were observed either in the presence of relatively familiar of unfamiliar adults in a structured play situation in the home at 18 and 24 months, and in a more naturalistic home observation at 22 and 23 months. Multivariate analyses were used to examine the sensitivity of measures of style and structure to situations and age. Style variables revealed short term situational effects; however, both types of variables revealed changes with age and differences between situations which were sustained over time. Results suggest that the manipulation of context factors and multivariate procedures might provide a useful way of analyzing components of play as a complex system of behavior. (Author/ED)

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The Development of Play:

Style, Structure and Situations[1]

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00002

Abstract

The purpose of the study was to examine the extent to which situational context differentially influences components of play. Two groups of play variables were distinguished. Style variables, which reflect the overall tempo and diversity of play, were viewed as relatively sensitive indicators of short term reactions to situations, whereas structural variables were viewed as relatively sensitive indicators of more enduring aspects of cognitive development. Children were observed in the presence of relatively familiar or unfamiliar adults in a structured play situation in the home at 18 and 24 months, and in a more naturalistic home observation at 22 and 23 months. Multivariate analyses were used to examine the sensitivity of measures of style and structure to situations and age. As hypothesized, style variables revealed short term situational effects. However, both types of variables revealed changes with age and differences between situations which were sustained over time. Although a preliminary study, results suggest that the manipulation of context factors and multivariate procedures might provide a useful way of analyzing components of play as a complex system of behavior.

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The Development of Play: Style, Structure and Situations

It has been argued that the importance of play is that it is a system of behavior which brings children into contact with features of the environment, thus providing an opportunity for self-initiated, self-sustained learning (White, 1959; Millar, 1968). For all its presumed importance, play has been difficult to study systematically, in part, perhaps, because as a vague and global concept, it is not readily translated into manageable behavioral categories (Berlyne, 1969). Thus, a question of considerable interest is how to partition a stream of activities as complex as play so as to assess its psychological characteristics and functions (Berlyne, 1960, 1969; Hutt, 1970; Nunnally & Lemond, 1973). Recent research illustrates two strategies for the partitioning of play which suggests that a distinction between style and structure might be useful.

According to some investigators, the diversity of objects that children contact or the diversity of their activities with a particular object reflect children's style of play. Style of play has been associated with problem solving strategies (Kagan, 1971; Reppucci, 1970) or rate of information processing (Messer & Lewis, 1972). It has also been noted that a child's manipulative activity is influenced by situational events; for example, the presence or approach of a stranger reduces a young child's contact with the physical environment (cf. Ainsworth & Bell, 1970; Maccoby & Feldman, 1972). In this sense, children's style of play might reflect context sensitive momentary motivational or affective states.

Play has been viewed in other ways as well. In a recent study reported by Inhelder, Lezine, Sinclair, & Stambak (1972) play is cast into a cognitive developmental framework. What children do with objects changes between 1 and 3 years of age. For example, activities with one object decline, as activities with two objects increase. Changes in the structure of play activities presumably reflect a shift from simple sensory-motor activities to combinatorial activities which index

the child's growing capacity to conceptualize relations between objects. In the present report, we consider some implications of the distinction between style and structure for the study of children's play.

Style of play. The contrast between specific exploration and diversive exploration (Berlyne, 1960; Hutt, 1970; Nunnally & Lemond, 1973) typically provides the basis for measures of children's style of play. Specific exploration refers to a child's activity with a particular object. In contrast, diversive exploration refers to a child's widely ranging contacts with an array of objects. In situations which permit choices, it is possible to examine children's sustained directed involvement with individual objects (Kagan, 1969; Reppucci, 1970; McCall, 1975), as well as the diversity of their contacts (Goldberg & Lewis, 1969; Messer & Lewis, 1972).

Suppose a child's activities are divided into an action component and an object component. In specific exploration, the relation is that of many actions to one object--individual actions might be brief or sustained, but the child samples one object while selecting broadly from his repertoire of behavior: A child might pick up an object and then shake, bang, mouth, or throw it. In diversive exploration, the relation is of one action to many objects--the child samples broadly from the objects in an array but narrowly from his behavior repertoire: A child might pick up one object after another, thus holding the action component constant. It is evident that a child who contacts many different objects and who does many things with each of them within a given period of time will show a relatively high rate of action-object change. In order to summarize different patterns of action-object relations, at least three variables seem necessary: (a) one which reflects the extent to which a child restricts his activity to a particular preferred object, (b) another which considers the diversity of object contacts and (c) a third which considers the rate at which actions and/or objects change.

Several investigators have examined individual differences in children's style of play. According to one point of view (Kagan, 1969), a young child's tendency to engage in sustained directed activity (based on the time spent with particular

objects) indexes a reflective style of problem solving. According to other investigators, preference for a particular object and the tendency to contact a great many different objects reflects the child's level of information processing (Messer & Lewis, 1972). Although Pederson & Wender (1968) and Reppucci (1970) have reported a relation between sustained involvement with toys and a reflective style of problem solving, there is considerable uncertainty regarding patterns of developmental change in young children. There is some reason to believe that children's play style might be especially susceptible to immediate situational factors--the novelty or complexity of toys (Switsky, Haywood, & Isett, 1974; McCall, 1975) or the presence of unfamiliar persons (Ainsworth & Bell, 1970; Maccoby & Feldman, 1972; Marvin, 1972), but again, there is some uncertainty regarding developmental changes, especially during the second year of life. The latter findings are of special interest because they suggest that the physical and social aspects of a situation provide a context for children's play, and that style variables might index short term situational factors rather than stable individual or developmental differences.

A taxonomy of actions. Measures of curiosity, exploratory or manipulative behavior are often based on the object side of children's activity--the duration, latency, or frequency of object contacts. Distinctions among actions are most likely to be made in studies which present the child with one object at a time. For example, Switsky et al. (1974) differentiated exploration (the examination of an object visually and tactually) from play (rhythmic manipulation of the object or use of it symbolically to represent something else) thereby partially adopting a scheme proposed by Nunnally & Lemond (1973). In a recent study of free play, McCall (1975) defined finer qualitative categories (e.g., mouthing, appropriate behavior, secondary and tertiary circular responses), which showed significant changes between 8 and 12 months of age. Yet to many developmental theorists (Piaget, 1962; Werner & Kaplan, 1964) the form or structure of an activity is the most consequential aspect of children's object transactions. Indeed, a recent observational study by Inhelder, Lezine, Sinclair & Stambak (1972) posited that during the second year of life changes in the way chil-

dren manipulate objects should parallel changes in their tendency to use objects symbolically. Suppose activities are classified according to their structural characteristics. In a Piagetian taxonomy, one-object activities would be the most primitive. The child manipulates one object at a time, using sensory-motor behaviors such as pushing, pulling, throwing, waving. At a somewhat more advanced level, children manipulate the parts of objects (wheels, knobs) and place two objects in relation to one another (i.e., on top of, into, next to) often governed by an apparent recognition of how objects typically go together (cup on top of table, spoon into cup). Presumably, such activities reflect the child's differentiation and organization of spatial relations--both the relation of a distinctive part to the whole and the relation of one object to another. Finally, the child comes to acknowledge other characteristics of objects (e.g., roundness) and to use these characteristics in his organization of them. It is at this level that he is able to solve form board problems or put rings on a stacking pole. It is also at this time that the child begins to build towers and rows in which objects are systematically ordered with respect to physical, spatial, or temporal schemes. It should be noted that age norms for items on infant developmental tests (cf. Bayley, 1969) seem to follow a similar sequence. From a developmental perspective, the striking phenomenon is that prior to a certain time, the task of putting a round form into a round hole simply doesn't make sense to the child. The observations of Inhelder et al. suggest a developmental progression in which representational schemes (as reflected in pretend play), are linked to the organization of operational schemes (Piaget & Inhelder, 1971). The child initially performs action routines on an object treated as if it were a distinctive, undifferentiated pattern, unrelated at any given time to other objects in an array. Then, as individual object patterns become decomposed and dimensionalized, new patterns of "objects-in-relation" can be constructed by way of special combining activities which eventually can be applied iteratively. A new way of representing objects is associated with a new way of organizing relations

between objects. Thus, on theoretical and empirical grounds, there is some reason to believe that how children use objects in play expresses developmental changes in the practical, adaptive side of intelligence. If children's style of play is vulnerable to situational factors, what about the structure of play? If the child has acquired sophisticated modes of using objects, will he use less sophisticated modes at times of situational stress?

Different aspects of play--its style and its structure--may reflect different psychological processes. With respect to style of play, interpretations disagree considerably, and how variables associated with children's style of play change with age is uncertain. If, for example, a high level of action-object change is a sign of impulsivity, one might expect to find a decline with age; if, however, the measure reflects information processing, one might expect an increase with age. If the specific exploration of a preferred object is related to the breadth of the child's behavioral repertoire, one might expect to find an increase with age as new activity schemes become functional. The developmental implications of the structural aspect of play seem clearer. Changes in the way children use objects between 18 and 24 months--most especially, the way they impose upon objects relatively sophisticated modes of organization--presumably reflects the child's acquisition of mental structures which lead to new ways of dealing with objects in relation to other objects. With respect to situational factors, children's tendency to involve themselves with objects is apparently vulnerable to factors such as the presence of unfamiliar adults, but whether structural aspects of play show a regression to less mature levels is unclear.

In the present study, we asked whether style variables would be relatively more sensitive than structural variables to context variations such as the familiarity of persons and whether structural variables would be relatively more sensitive to changes with age between 18 and 24 months. Is it possible to separate style from structure by separating short term situational effects from long term developmental

changes? The study attempted to avoid some of the problems of previous research. Children were observed under different circumstances in their own homes, rather than the laboratory. Familiarity was experimentally varied, so that it was possible to compare and "unfamiliar" and "habituated unfamiliar" (Cohen, 1974). In addition, familiarization occurred over a relatively long period of time, and the adult's role of experimenter-observer during familiarization was similar to the one she would have in the study. Most importantly, multivariate procedures were used so that the analyses would take into account the notion that subcategories of play behavior are interrelated parts of a broader, complex system of behavior.

Method

Subjects. The data analyses were drawn from a longitudinal study of play in home and laboratory settings. The children were predominantly from middle class homes. None of the fathers were unemployed and the occupations of the fathers represented blue collar (25%), white collar (25%), business (31%), and professional (18%) categories. The children were observed in a structured play situation in their own homes when they were 18 months old, and then 6 months later, when they were 24 months old. The 7 children (4 boys, 3 girls) in the Familiar group had seen the experimenter on three previous occasions. The 8 children (4 boys, 4 girls) in the Unfamiliar group had not. In order to examine short term changes, the children were observed on two occasions at each age level. These visits were approximately two weeks apart (Visit 1 and Visit 2). For the structured situation, the design thus contained two familiarity conditions (Familiar-Unfamiliar), two ages (18 months and 24 months) and two Visits (Visit 1 and Visit 2) as repeated measures. Due to the small number of children in each group, analyses were not performed for sex.

Familiarization procedure. The children in the Familiar group were visited in their own homes at 16 and 17 months by the same experimenter who recorded their behavior in the present study. These visits included both observations of spontaneous play and structured observations with materials not included in the present toy set.

The children saw the experimenter on a third occasion (at 15 months) in a laboratory setting, where, in addition to a play observation, children were given a standardized test. The group thus had an opportunity to become familiar with the experimenter, as an observer, as one who presents interesting play materials, and as a friendly person.

By 18 months, children in the Familiar group were exposed to the experimenter 3 times for periods lasting an hour to an hour and a half. In contrast, at 18 months children in the Unfamiliar group had not previously participated in developmental research of any type. The initial assignment of children to Familiarization groups was random.

Structured play situation. In the structured situation, the children played with a toy set brought in by the experimenter. Each visit began with an introductory period of approximately 15 to 20 minutes of social conversation with the mother. The female experimenter responded warmly to the child's overtures but did not initiate interaction with him. After the introductory period, the mother was given a toy or a book, and asked to keep the child occupied while the toys were set out. A set of approximately 50 commercial toys and household objects, housed in two suitcases, was presented in a standard arrangement at the beginning of each 10-minute play period. The experimenter invited the child to play with the toys. Then she withdrew some 6 or 8 feet away and began to orally record on tape in a low voice an ongoing description of the child's behavior. Thus, in the play session, it was the observer who was either the stranger or the familiar person. Since two different individuals played this role for approximately half the children in each group, it is unlikely that personal characteristics of the experimenters would account for group differences. In addition, the experimenters were naive regarding the purpose of the study.

Home observation. Between 18 and 24 months both groups of children were exposed to familiarization experiences similar to those described earlier for children in the Familiar group. At 21 months both groups visited the laboratory where they were

given the Bayley Scales of Mental Development. In addition, the spontaneous play of both groups was observed in the home at 22 and 23 months. Visits took place at a time of day when, in the mother's judgment, the child was most likely to play, although most mothers felt that their children were always playing. The mothers were asked to ignore the observer and do what they would ordinarily do at that time. The data for each home observation consists of approximately 45 minutes of solitary play activities as well as play activities mediated by other persons.

Data collection. In all play observations, the observer orally recorded the child's activities. A time attached to the tape recorder beeped every 10 sec. The coding scheme from which all play measures were derived was based on a preestablished list of approximately 50 core verbs which described specific actions ("puts into," "fits," "bangs," "feeds"). A verb was coded only when the child's activity with an object was visually directed (except for mouths), and contacts were coded whenever there was a change in either action, object or both. A unit (e.g., bangs-drum) which was sustained or repeated over adjacent 10 sec. intervals could be coded again, but a unit sustained or repeated with a 10 sec. interval could only be counted once. Although action-object units were continuously sampled, the record was blocked into time intervals which made it possible to base measures on either time units or behavior units. For example, the pretend play measure was based on behavior units--a child could be credited with more than one pretend activity within a 10 sec. interval. In contrast, focal object involvement was based on the number of time intervals in which the child played with his most preferred toy. In order to make the structured situation and the home observation as comparable as possible, any object contacts in the latter situation were coded unless they involved practical activities. For example, if the child had a box of raisins, manipulative activities such as shaking the box, lining up the raisins, were coded, whereas eating the raisins was not.

The first step in data reduction occurred when the tapes were transcribed. Each verb was coded according to its a priori membership in a broader-category so that the

coded protocol from which scores were tabulated contained an activity code designating each activity or object change with a 10 sec. time interval. In addition, the different objects used during a 10 min. period were listed. Observer reliabilities were based upon 120 minutes of filmed play episodes of children who participated in a pilot study. Since the study reported here was part of a larger research effort concerning children's play, the filmed play episodes were a useful way of assuring that the several observers who participated in data collection throughout agreed with one another regarding the basic observational scheme. The filmed episodes were also a solution to the problem of obtaining reliabilities in a home setting with an oral recording procedure. Reliability estimates based on the proportion of agreement to the sum total of observed units within a category averaged over 4 filmed sequences are given in parentheses after the description of each measure. Additional reliability checks in a laboratory setting taken several times in the course of different studies of play yielded comparable results.

Play measures were divided into two groups. The five structural measures were based on how the children used objects, adopting the framework suggested by Inhelder et al.(1972). Levels 1 to 3 represent increasingly sophisticated manipulations and combinations of objects. Pretend play presumably reflects the appearance of the symbolic function. Social object actions reflect the use of objects in social exchanges. In order to control for variations in the overall level of activity, these measures are calculated as proportions of the total number of activity units. The style measures were based on summary counts of tempo, object diversity, focal object involvement and positive affect. The nine measures and observer agreements are listed in Table 1.

Table 1 about here

Results

The data were analyzed in two stages. First, a multivariate analysis of variance (Familiarity x Age x Visit), with repeated measures, was performed on all nine measures of play behavior. Since some measures exhibited heterogeneity of variance, analyses were also performed on log transformed scores (log x +10). Only those results which were significant for both raw and transformed scores are reported. If the overall multivariate F-ratio was significant for any main effect or interaction, a second set of multivariate analyses were performed in order to examine whether style measures, structural measures or both, contributed to the significant effects. The contribution of style measures as a group was assessed by using structural measures as covariates, whereas the contribution of structural measures as a group was assessed by using style measures as covariates.

Results indicate that differences between Familiarity groups changed over time. It is noteworthy that the multivariate Familiarity x Age interaction was significant for style measures, not for structural measures ($F(4/44) = 6.514$, $p = .001$). The mean scores for style variables are shown in Table 2. Two of the style measures--the rate of object-action change and positive affect yielded significant univariate effects. At 18 months, children in the Unfamiliar group smiled more and showed a faster pace of activity than did children in the Familiar group. Apparently, the presence of unfamiliar people and circumstances can have a pleasurable, energizing effect. By 24 months, the direction of the differences was reversed: children in the Familiar group changed activities more rapidly and smiled more than did children in the Unfamiliar group. It is as if children's response to new and interesting events which initially produces heightened, pleasurable exploratory activity, decays with repeated exposure, and long-term developmental changes (for example, an increase in the pace of activity) become evident only when short-term effects subside.

Table 2 about here

The analyses also revealed significant age differences. Mean scores at 18 and 24 months are shown in Table 3. When style variables are used as covariates, structural variables show significant age differences ($F(5/44) = 3.164$, $p = .016$), even though none of the univariate tests reach acceptable levels of significance. The age effect for structural variables is carried primarily by a decline in Level 1 activities and an increase in Level 2 activities, although the multivariate F-ratio for these two variables is only marginally significant when the other structural variables are used as covariates ($F(2/48) = 2.674$, $p = .079$).[2] However, the reverse procedure does not yield even marginal differences ($p = .324$). When structural variables are used as covariates, style variables also show a significant age effect ($F(4/44) = 6.746$, $p = .001$). Two of the style measures which are not complicated by Familiarity x Age interaction yielded significant univariate differences. The diversity of children's object contacts increases with age, and the tendency to focus on a particular object decreases. The analyses did not reveal a substantial modification of play behavior over a two week period. None of the main effects or interactions associated with visits were significant. Thus changes over the 6 month period seem to reflect genuine developmental differences. Contrary to our initial expectations, style variables were relatively more sensitive to developmental changes than were structural variables.

Table 3 about here

The results also suggest that some components of the initial difference between the groups are sustained over a 6 month period. Both style variables ($F(4/44) = 4.183$, $p = .006$) and structural variables ($F(5/44) = 4.527$, $p = .002$) contribute to group differences at both ages. Level 2 activities and social object actions are the structural variables which reflect differences between Familiar and Unfamiliar groups. As indicated in Table 4, the Unfamiliar group engaged in relatively fewer

Level 2 activities, and relatively more activities which involved the use of an object to mediate a social exchange. Children in the Unfamiliar group also tended to be more diverse in their object contacts and less prone to engage in sustained activities with a particular object. The findings are striking in that they suggest that a child's first contact with a situation may set a way of behaving in it which is relatively stable over time. In the present case, it is as if the presence in the home of visitors and attractive new toys was initially an occasion for gleeful, fast paced, diversive exploration and social sharing for children in the Unfamiliar group. If, however, the child had had previous contact with the experimenter (and perhaps, more importantly, with the experimenter's roles as observer and bringer of new toys), the occasion was initially responded to quite differently; more soberly, less socially, and with relatively more mature object activities. Although some components of the initial response pattern subside by 24 months, others persist.

Table 4 about here

An alternative hypothesis is possible. The groups might simply have differed. An analysis of Bayley scores at 21 months fail to reveal significant group differences, although the Familiar children performed somewhat better than Unfamiliar children. In addition, the groups did not differ at 28 months on the Stanford-Binet.

Data from the home observations were also analyzed for all nine variables using the multivariate procedures described earlier. Results indicate that in the absence of the experimenter's toys, familiarity groups did not show significantly different patterns of behavior. But the difference between the home "as it is" and the home supplemented by an experimenter's toys is dramatic (see Table 5). In the home observation, less mature activities almost double; pretend, social object actions, and the diversity of object contacts decline by almost half; children show less sustained object activity and a slower pace of activity. Relative to play in a structured situation, play in the home was fragmented and stereotyped--characterized by short

bursts of interest, followed by aimless wandering and relatively little object exchange with the mother. Although negative affect was too infrequent to be worthwhile coding in the structured situation, it occurred frequently during the home observation. Thus the increase in smiling was accompanied by an increase in fussing and whining.

Table 5 about here

Discussion

One purpose of the present study was to examine whether play behavior could be roughly divided into one set of variables associated with style and another set associated with structure. Multivariate procedures were used to examine how individual measures function as a group. An encouraging finding was that style variables were relatively more volatile than structural variables; some seemed to reflect fairly short term, emotional aspects of situations. However, both style and structural variables were sensitive to age changes. With age, children tend to contact the environment more broadly, and become less perseveratively attached to a particular object. Unhappily, structural variables were less sensitive to age changes than one would expect on theoretical grounds and from previous research (cf. Inhelder, et al., 1972). Again, it is necessary to note that the conceptualization of structural variables as indices of cognitive competence, requires an equivalent conceptualization of the setting in which competence at any level is expressed. Although in the structured situation children were given a wide array of play materials to choose from, the kinds of materials likely to engage the highest level of competence at 24 months might have been missing. If so, we placed a ceiling on the data which might have led the 24 month olds away from sustained activity with a particular object toward more diversive exploration of the available resources.

The finding that on some measures initial differences between Familiar and Unfamiliar groups did not become attenuated with subsequent experiences, poses additional questions for future research. Is it possible that behavior in some situations becomes "set" on the first encounter? For example, does a child's first birthday in some sense establish birthdays as joyful, gift-receiving occasions? Does a child's encounters with some especially vivid settings (doctor's office, playground, grocery store) establish a schematic outline of setting characteristics which govern what to expect and how to behave? Children in Familiar and Unfamiliar groups seemed to have strikingly different notions of what to do when someone brings attractive new toys into the home. For children previously exposed to similar situations, it was an opportunity for sustained, manipulative activity activity at a relatively mature level; for children who had no previous experience of this type, it was an opportunity to share the new toys with the mother, an interest which was accompanied by a less mature level of activity. Evidently, the form of children's activity is not immune to situational factors. Moreover, it may be that positive as well as negative events--perhaps, any event which arouses strong affect--has a disruptive influence on both the style and structure of play. Although we originally supposed that the form of children's activity would be immune to situational factors, that children would play at their most advanced level even though the pace or tempo of play might be disrupted, the results suggest that situational factors have a pervasive influence on both aspects of play. Again, the implications for research, especially the study of individual differences, is considerable.

Consider some of the problems encountered by the attempt to manipulate situational context in order to separate components of play. In the structured situation, the home was invaded by research persons and research paraphernalia. Although one group of children was unfamiliar with either persons or procedures, the results do

not support the notion that an invasion of this type in which children are not pressured into performing would be ominous or stressful. On the contrary, children seemed to enjoy it. Their behavior seemed to reflect a positive reaction to novelty rather than a negative reaction to strangers. In retrospect, it seems obvious that home is where young children first come into contact with unfamiliar persons. Although homes undoubtedly vary in the number and diversity of visitors, it is where children frequently encounter strangers--the plumber, the Avon lady, and, perhaps, less often the toy salesman--in exchanges which are affectively neutral or even positive. If so, home may be a place in which unfamiliar people can be sources of pleasurable experiences. The problem is both substantive and methodological. The substantive question is whether the analysis of play can provide a model of cognitive development based on how children spontaneously practice what they know, how such practice supports the acquisition of new knowledge, and how social and motivational factors influence both practice and acquisition. The methodological question is the extent to which our analysis of substantive problems is beclouded by factors introduced inadvertantly by the design of our observations. The results of the present study suggest that as a special kind of context, the research enterprise itself--whether transported to the child or the child to it--must be placed in perspective in order to study the multiple forms and functions of play.

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Footnotes

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[2]Thirteen of the fifteen children showed increases in Level 2 or Level 3 activities between 18 and 24 months. Children who received relatively high Level 2 scores at 18 months tended to show a drop in Level 2 scores by 24 months, accompanied by an increase in Level 3 scores. Children whose Level 2 scores at 18 months were relatively low tended to show substantial gains by 24 months. For these children, Level 3 changes were relatively modest.

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TABLE 1

Play Variables and Inter-observer Agreement

	Observer Agreement
Structural Variables[1]	
% Level 1 activities: those which involved sensory-motor actions on a single object, such as pushing, shaking, mouthing or banging, performed on one object.	84%
% Level 2 activities: those in which either objects were brought into spatial proximity with one another or a part of an object was moved.	85%
% Level 3 activities: those in which two objects were brought into relation with one another according to a common perceptual feature.	91%
% Pretend activities: those which (a) involved treating something inanimate as though it were animate, (b) resembled ordinary everyday activities but occurred in the absence of necessary materials such as drinking from an empty bottle, (c) were not carried through to their usual outcome, such as putting on a hat, but not going outdoors; closing eyes, but not sleeping, or (d) are typically performed by someone else, such as dialing a phone, brushing hair.	94%
% Social-object activities in which the child used an object in a social gesture such as offering or showing it, or in a social exchange such as giving and taking.	92%

[1]Structural variables are calculated as the proportion of total activity-object units.

TABLE 1 (cont.)

Play Variables and Inter-observer Agreement

	Observer Agreement
Style Variables	
Rate of Action-Object change was the number of activity-object unit changes per 10-sec. interval.	97%
Object Diversity was the number of different objects contacted over an observation period.	92%
Focussed Object Involvement was the time the child spent with his most frequently contacted object.	90%
Positive Affect was based on the child's smiles and laughter.	84%

TABLE 2

Style Variables: Mean Scores, Univariate p-values, and Discriminant Function Coefficients for the Familiarity x Age Interaction

Style Variables	Group	Age (months) 18	Age (months) 24	Univariate p-value[1]	Discriminant Function Coefficient*
Object Diversity	FAM	.22	.27	n.s.	.38
	UNF	.27	.31		(-.3[illegible])
Focal Object Involvement	FAM	.30	.28	n.s.	-.26
	UNF	.29	.21		(.23)
Action-Object Change	FAM	1.22	1.33	.027	-1.17
	UNF	1.29	1.14	(.003)	(.88)
Positive Affect	FAM	.02	.03	.007	-.80
	UNF	.05	.01	(.008)	(.76)

[1]The numbers in parentheses refer to results of analyses using structural variables as covariates.

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TABLE 3

Mean Scores, Univariate P Values and Discriminant Function Coefficients

For the Main Effect of Age

	Age (Months)		Univariate	Discriminant Function	
	18	24	P Value*	Coefficient*	
Structural Variables					
% Level 1	.38	.34	-	-4.53	(-5.70)
% Level 2	.24	.28	-	-4.53	(-5.20)
% Level 3	.16	.17	-	-3.94	(-4.62)
% Pretend	.12	.12	-	-3.17	(-3.73)
Social Object Actions	.11	.12	-	-4.06	(-4.90)
Style Variables					
Object Diversity	.24	.29	.020 (.025)	-0.83	(.81)
Focal Object Involvement	.29	.24	.045 (.012)	0.24	(-.83)
Action Object Change	1.25	1.23	-	1.01	(.24)
Positive Affect	.04	.02	.055 (.073)	0.64	(.65)

*Multivariate $F(9/44) = 3.922$, $p = .001$; when style variables are covariates, $F(5/44) = 3.164$, $p = .016$; when structural variables are used as a covariate, $F(4/44)=6.746$, $p = .001$. The numbers shown in parentheses refer to covariance analyses.

TABLE 4

Mean Scores, Univariate P Values, and Discriminant Function Coefficients for the Main Effect of Familiarity

	Familiarity		Univariate	Discriminant Function
	FAM	UNF	P Value*	Coefficient*
Structural Variables				
% Level 1	.33	.39	-	3.462 (3.82)
% Level 2	.32	.21	.001 (.002)	2.555 (2.57)
% Level 3	.15	.18	-	3.019 (3.11)
% Pretend	.13	.12	-	2.024 (2.09)
Social-Object Actions	.09	.15	.076 (.034)	2.916 (3.09)
Style Variables				
Object Diversity	.24	.29	- (.016)	0.975 (-1.14)
Focal Object Involvement	.29	.25	.028 (.267)	0.133 (-.15)
Action-Object Change	1.27	1.21	-	0.962 (.90)
Positive Affect	.03	.03	-	-0.368 (.44)

*Multivariate $F(9/44) = 3.856$, $p = .001$; when style variables are covariates, multivariate $F(5/44) = 4.527$, $p = .002$; when structural variables are covariates, multivariate $F(4/44) = 4.183$, $p = .006$. Numbers in parentheses refer to results of covariate analyses.

TABLE 5

Mean Scores for the Structured Situation and Home Observation

	Situations			Univariate
	SS (18)	HO (22-23)	SS (24)	P-Value*
Structural Variables				
% Level 1	.38	.51	.34	.007
% Level 2	.24	.28	.28	-
% Level 3	.16	.08	.17	.001
% Pretend	.12	.07	.12	-
% Social Object Actions	.11	.06	.12	-
Style Variables				
Object Diversity	.24	.12	.29	.001
Focal Object Involvement	.29	.19	.24	.001
Action-Object Change	1.25	.82	1.23	.025
Positive Affect	.04	.06	.02	.040

*Multivariate $F(18/68) = 7.675$, $p < .001$.